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lications, to contain high-class reproductions of seventy-two of the principal subjects, as well as a list of several hundred new nebulæ incidentally recorded on the negatives.

The purpose of this announcement is that suitable acknowledgment may be made concerning the generosity of the following friends of the Lick Observatory, who have provided funds to meet such portions of the expenses of reproducing the photographs as cannot be supplied from printing funds appropriated by the State of California:—

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THE SUN'S CORONA.

Professor SVANTE AUGUST ARRHENIUS, of the chair of physics in the University of Stockholm, Sweden, who spent two months during the summer at the University of California, is the author of *Lick Observatory Bulletin*, No. 58, which gives his observations on the physical nature of the Sun's corona as observed at total solar eclipse. The *Bulletin* is a notable contribution to astronomical literature in that it reconciles hitherto conflicting scientific opinion concerning an important phase of the Sun's constitution. An abstract of the *Bulletin* is as follows:—

This paper was written by Professor ARRHENIUS during his recent visit on Mount Hamilton for the purpose of harmonizing the apparently conflicting results as to the sources of the coronal light obtained by the Crocker expeditions from the Lick Observatory and by the Smithsonian Institution obser-

vations. Astronomers CAMPBELL and PERRINE held the view that the light of the inner portions of the corona is due to radiation from minute dust particles maintained at a temperature of incandescence by the enormous heat of the adjacent solar surface, and that the light from the outer corona is composed mainly of sunlight reflected and diffracted by the colder dust particles composing this part of the corona. The Lick Observatory conclusions were based upon the character of the spectrum of the corona.

The Smithsonian observers measured the quantity of heat received from the corona and were surprised to find that, even in the immediate proximity of the solar surface, the effective temperature was substantially that of the room in which they were observing. They therefore held the view that the main source of light from the corona is not the incandescence of its particles, but that the radiations are in the nature of an electrical discharge. ARRHENIUS has succeeded in harmonizing all the results of observation by showing that the particles in the region observed must be at a temperature of about 8,000° Fahrenheit, and therefore must be radiating light by virtue of their incandescence, but that the particles are so few and far between that the effective temperature observed is not the temperature of the particles themselves, but is the average temperature for the incandescent particles and the cold background of space upon which these particles are seen, here and there, in projection. The total area of the background covered by the particles in projection is but a minute fraction of its whole area. The spectroscopic and thermometric observations are completely harmonized by assuming that, in the part of the corona observed, there is but one minute dust particle for each fifteen cubic yards of space.

ARRHENIUS has, on this supposition, computed the total mass of the corona, and has found its most probable value 25,000,000 tons. This is approximately the same as that of a cube of granite whose sides are 670 feet in length. The quantity of matter involved in the corona is thus shown to be exceedingly slight, considering that it occupies a space whose dimensions in every direction amount to several millions of miles.

W. W. CAMPBELL.